EARLY POSTGLACIAL ENVIRONMENT OF A SMALL KETTLE IN MERCER COUNTY, OHIO[1]

DONALD R. URBAN AND JANE L. FORSYTH
Soil Conservation Service, Defiance, Ohio
and
Bowling Green State University, Bowling Green, Ohio

ABSTRACT

Excavation of a series of pits in a filled kettle at St. Charles Seminary, in southeastern Mercer County, revealed nine to twelve feet of lacustrine silty-clay sediments above clay-rich till. Near the bottom, in the middle of the kettle, the sediments were mostly clays, and contained organic material. Fragments of *Picea* (spruce) and a few specimens of the mollusks, *Helisoma anceps striatum*, *Gyraulus altissimus*, and *Amnicola limosa*, from the bottom imply an open kettle (lake) in a boreal climate at this time of initial sedimentation. Sediments immediately above this level contained *Thuja* (northern white cedar), which could indicate either boreal or somewhat less cold conditions. Strata higher in the section were more silty and contained some seepage, but lacked any organic material. Soils of the Montgomery series have developed in the fill of the kettle; soils in the surrounding ground moraine are in the Blount and Morley series.

During an investigation of the soil characteristics on the site of a proposed sewage lagoon at the St. Charles Seminary in Mercer County, a section of lacustrine clay and silty clay was revealed. These materials occurred in a kettle in the ground moraine just north of the St. Johns Moraine. Wood fragments and mollusks collected from the lower levels of the lacustrine filling of this kettle provide some information about the early postglacial environment of this area. The purpose of this note is to document these local environmental data.

LOCATION AND DESCRIPTION OF AREA

This investigation took place on April 16, 1969, as a result of a request to the Mercer County Soil and Water Conservation District for a site evaluation, and was being serviced by the Soil Conservation Service, under the direction of the senior author and of Alex R. Brock of the Ohio Division of Lands and Soil. It was accomplished by the excavation of eight pits in the kettle filling, to depths

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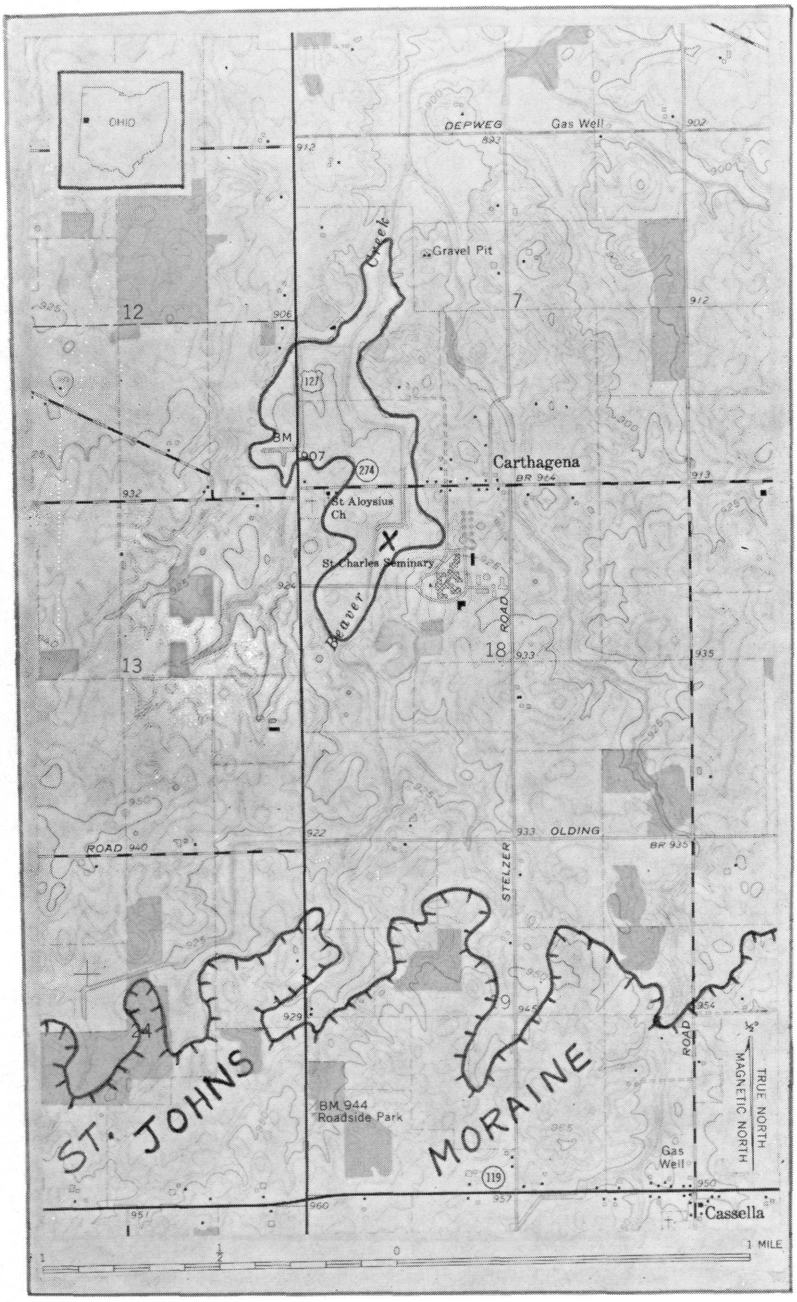

FIGURE 1. Location of kettlehole at St. Charles Seminary, Mercer County, Ohio. Spot marked X identifies location of pit 5, from which organic materials were obtained.

of nine to twelve feet, with a backhoe hired by the Seminary. Organic samples, from which the subsequent environmental inferences were made, were collected from pit 5. The junior author was not present at the investigation, but assumed responsibility for obtaining identification of the organic materials collected and assisting in documenting the results. The mollusks were identified by Dr. Aurèle La Rocque of the Geology Department of The Ohio State University, and identification of the wood fragments was by Dr. George W. Burns of the Botany Department of Ohio Wesleyan University. The authors wish to express their appreciation to both for their assistance.

The site of the investigation was a large kettle, with an area of 100 acres or more, located in ground moraine in southeastern Mercer County (NW ¼ of Section 18, Marion Township; on the Montezuma Quadrangle), about a mile north of the St. Johns Moraine (fig. 1). Surface elevation at this site is about 900 feet above MSL, with maximum elevations on the nearby ground moraine of about 925 to 935 feet above MSL. Soils in the area of the ground moraine belong to the Morley and Blount series and are developed in high-lime clay-loam glacial till. The soil in the kettle was identified as the Montgomery series, a very poorly drained dark-colored soil developed in calcareous clay and silty-clay lacustrine deposits.

STRATIGRAPHIC SECTION

A series of eight pits were excavated in a rough grid pattern. In each pit, a section of lacustrine clay deposits was revealed, below which was exposed, in some of the pits, dense clay-loam glacial till. The lacustrine section varied in thickness from about nine to twelve feet, indicating that the original surface on the underlying glacial till was bowl shaped, typical of that of a kettle (or depression made by the melting out of a block of glacial ice). Organic materials were found in the lower portions of the bowl-shaped depression, beneath silty deposits in the higher portions characterized by some seepage. Organic material was found in three of the pits, but was thickest in pit 5, from which the samples were obtained. Equipment limitations and seepage did not permit excavation to the underlying till in this pit; the depth to and presence of the till was inferred from correlation of the stratigraphic section exposed in pit 5 with those found in the other pits where till was exposed.

A detailed description of the section from which the samples were obtained in pit 5 is given below.

Unit	Material	Thickness (in feet)	Depth to Top of Unit (in feet)
1.	Dark-gray granular silty clay	1	0
2.	Dark-gray silty clay	2	1
3.	Mottled brown and gray plastic clay	5.5	3
4.	Gray, very plastic clay	1	8.5
5.	Black silty-clay loam, high in organic material and silt, and containing fragments of wood (*Thuja*, ident. by G. W. Burns)	2	9.5
6.	Marly silt loam with strong sulfurous odor, with some small wood fragments (gymnosperm, probably *Picea*—G. W. Burns) and a few mollusks (*Helisoma anceps striatum*, F. C. Baker, *Gyraulus altissimus*, F. C. Baker, and *Amnicola limosa* (Say), ident. by A. La Rocque)	½+ (1?)	11.5
7.	Dense clay-loam till, inferred on the basis of stratigraphic sections in adjacent excavations within the sewage-lagoon area.		12 or 13 (?)

ENVIRONMENTAL INFERENCES

The base of this section appears to date from only shortly after the retreat of the glacier from Mercer County. Because the lacustrine materials occur in a kettle, melting of the ice block that made the kettle must have taken place during the short segment of earliest postglacial time. The basal lacustrine unit (Unit 6) appears to lie directly on till and contains wood fragments identified as gymnosperm, probably *Picea* (spruce) (G. W. Burns, personal communication, May 20, 1969), which suggest the presence of boreal conditions at that time. Apparently the fragments of spruce wood came from trees growing near the kettle lake and were washed into the water, where they sank to the bottom and became incorporated in the lacustrine sediment.

The mollusks found at the site also come from Unit 6 and are all snails whose occurrences "are lacustrine, shallow water, and widespread in Pleistocene deposits" (Aurèle La Rocque, personal communication, August 25, 1969). In his report on Ohio Pleistocene mollusks, La Rocque (1968) reports that *Helisoma anceps striatum* is "found in lacustrine deposits, in marl, silt, and peaty marl . . . in shallow freshwater lakes with abundant vegetation, with pH as high as 8, and with fixed carbon dioxide of about 24 p.p.m." (p. 501). This species is not now living in Ohio, but was abundant in Pleistocene time here. La Rocque's distribution map (1968, p. 502) shows the species' known early postglacial distribution to be limited to Logan, Franklin, Ross, and Stark Counties, though this distribution is stated to be "Probably more extensive than is indicated here". *Gyraulus altissimus* is also not now living in Ohio, but is found in abundance in Pleistocene materials, though its mapped distribution in Ohio (La Rocque, 1968, p. 494) is only in Logan, Franklin, Union, Ross, and Stark Counties. The species is reported by La Rocque as inhabiting "shallow bodies of water with abundant vegetation" (p. 493). *Amnicola limosa* is a "species with a wide range of environmental preferences; it is found in creeks, rivers, and fresh- and brackish-water lakes. It is most abundant where there are thick beds of *Chara*, *Potamogeton*, *Vallisneria*, and *Elodea* . . . one of the most abundant species of marl deposits" (La Rocque, 1968, p. 385). This snail is part of Ohio's modern fauna, though its mapped distribution (La Rocque, 1968, p. 386), does not include Mercer County. The presence of these snails suggests that initially this was indeed an open lake, though containing abundant aquatic vegetation. Because only a few shells of each species were recovered, no inferences based on relative abundance are possible. It is interesting to note, however, that none of these snails, though common in Pleistocene deposits elsewhere, has previously been recorded from such materials in Mercer County.

Immediately above this lowermost stratum is another layer of lacustrine silt and clay containing fragments of *Thuja* (northern white cedar) (G. W. Burns, personal communication, May 20, 1969). Although these woody fragments are larger than those from the underlaying deposit, they too must have been washed into the kettle lake. *Thuja* is also a northern species, and has been reported from Ohio deposits rich in *Picea* (Burns, 1958, p. 223). Thus the vegetational evidence suggests that the boreal conditions implied by the spruce fragments were continuing. The fact that no *Picea* was found with the *Thuja* might be interpreted as evidence of a very slight warming trend, a trend that must have come soon after the deposition of the earlier layers, but this suggestion certainly cannot be confirmed on the basis of such limited information.

Subsequent stratigraphic units are all of lacustrine sediments, but none of them yielded any materials from which climatic conditions could be inferred. Unfortunately, no sampling for pollen was done, so that this possible source of climatic information is lacking. The presence of lacustrine silty clays of very similar character throughout the section supports only the interpretation of a small upland lake slowly filling with fine-grained sediment, with no major inflowing

stream bringing in coarser material, throughout a significant interval of late postglacial time.

Subsequently the lake became filled in and the Montgomery soil developed. Surface inflow is now being carried away by an open ditch (which also carries the flow of a small stream, Beaver Creek) and field tile have provided additional drainage to the area of the ancient kettle. The area has been farmed successfully for many years.

LITERATURE CITED

Burns, G. W. 1958. Wisconsin age forests in western Ohio II. Vegetation and burial conditions. Ohio J. Sci. 58; (4): 220–230.

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